35 U.S.C. § 112, which is believed to be moot, and to better distinguish over the prior art. No new matter is believed to have been introduced.

Concerning paragraph 1 of the Office Action, the objection to the drawing is respectfully traversed. The Examiner has objected to the ends of the blades which are positioned closer to the longitudinal middle of the developed view of Figure 2B being characterized as the "leading" end. However, Applicants respectfully submit that these ends are properly characterized as the "leading end" because they represent the most upstream end in the direction of rotation "r" of the rotor in Figure 2B. It is therefore respectfully requested that the objection to the drawings be withdrawn.

Concerning the rejection under 35 U.S.C. § 112, Applicants respectfully submit that the claims clearly recite the subcombination, i.e., the mixing rotor. Applicants respectfully submit that the referral in the claims to the tip clearance with respect the inner surface of the mixing chamber does not imply that the combination is being claimed. This merely represents the recitation of an environmental element which would be known to those skilled in the art. This is permitted in Orthokinetics, Inc. v. Safety Travel Chairs, Inc., 1 USPQ 2d 1081 (Fed. Cir. 1986) (MPEP § 2173.05(b)).

Concerning the objection to the word "longer," while this is a relative term, the use of relative terminology is permitted by the MPEP (MPEP § 2173.05(b)) when one skilled in the art would be apprized of the claim scope when read in light of the specification. Here, those skilled in the art would clearly understand that the "longer" blades are longer than the shorter blades. In any case, the claims now recite that the longer blades extend to "or beyond the longitudinal middle" of the rotor. Applicants respectfully submit that the amended claims are definite under 35 U.S.C. § 112.

Claims 1, 3, 11 and 13 were rejected under 35 U.S.C. § 102 as being anticipated by the U.S. patent to Lohmann. However, the amended claims are believed to clearly define over this reference.

As is described in the specification, according to a feature of the invention set forth in Claims 1 and 11, the pair of longer blades are twisted to cause the material to flow toward a longitudinal middle side of a developed view of the rotor, and include a first longer blade which is linear in the developed view "and extends from one longitudinal end of the mixer rotor toward the longitudinal middle side thereof," as well as a second longer blade which is substantially nonlinear in the developed view "and extends from the other longitudinal end of the mixing rotor toward the longitudinal middle side thereof" (page 9, lines 9-16). Since the first and second longer blades extend from the opposite longitudinal ends of the mixing chamber, they feed material to each other as shown in Figure 2B.

In contrast, the nonlinear longer blade A of Lohmann and the linear blade B or C of Lohmann do not extend from one end the other longitudinal end of the mixing rotor. Instead, the nonlinear longer blade extends from the left end (as seen in Figure 12 of Lohmann) whereas the linear longer blades B and C do not extend from either end, but instead begin and end at a mid-portion of the rotor. The claims therefore clearly define over Lohmann.

Claims 1, 3, 11 and 13 were also rejected under 35 U.S.C. § 102 as being anticipated by the U.S. patent publication of Regalia, particularly at Figure 5. However, this rejection is also respectfully traversed.

Regalia discloses a view of a developed rotor in Figure 5, in which both longer blades 6b extend from the same end of the rotor, and both shorter blade 7 extend from the same end of the rotor. Regalia therefore suffers from the same shortcomings as does Lohmann.

The Examiner appears to have alleged that the short blades 7 are the "longer blade" extending from the opposite side of the rotor. However, since the claims now require that the longer blades extend to or beyond the longitudinal middle thereof, the short blade 7 of Regalia cannot qualify as the claimed "longer blades," and so the amended claims clearly define over this reference.

Concerning the rejection of Claims 2 and 12 under 35 U.S.C. § 103 as being obvious over either Lohmann or Regalia, either taken in view of Nortey, it is noted that Nortey was cited to teach specific helix angles but provides no teaching for overcoming the shortcomings of Lohmann or Regalia, as noted above. Applicants therefore respectfully submit that the amended claims define over any combination of the above references.

Applicants therefore believe that the present application is in a condition for allowance and respectfully solicit and early notice of allowability.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.

Norman F. Oblon
Attorney of Record
Registration No. 24,618
Robert T. Pous
Attorney of Record
Registration No. 29,099

22850
(703) 413-3000
Fax #: (703) 413-2220
RTP/law
I:\atty\RTP\206585us-am.wpd

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IN THE CLAIMS

Please amend the claims as follows:

--1. (Amended) A mixing rotor for use in a batch mixer including a mixing chamber, the mixing rotor comprising a plurality of mixing blades, each mixing blade having a tip for defining a tip clearance [between a tip of the mixing blade and] against an inner surface of [a] the mixing chamber where the mixing rotor is to be rotatably placed to impart shearing forces to a material to be mixed in the tip clearance, [wherein the plurality of mixing blades include a nonlinear blade which is substantially nonlinear from a start point to a terminal point in a development of the mixing rotor developed into a plane about its longitudinal axis, and other linear blades which are linear in the development,] wherein the plurality of mixing blades include a pair of longer blades twisted in such a direction as to cause the material to flow toward a longitudinal middle side of the mixing rotor, and the pair of longer blades include a first longer blade which is linear in a development of the mixing rotor developed into a plane about its longitudinal axis and extends from one longitudinal end of the mixing rotor toward the longitudinal middle side thereof by or beyond the longitudinal middle thereof, and a second longer blade which is substantially nonlinear in the development and extends from the other longitudinal end of the mixing rotor toward the longitudinal middle side thereof beyond

the longitudinal middle thereof and whose helix angle gradually increases toward the other longitudinal end.

2. (Amended) A mixing rotor according to claim 1, wherein the helix angle of the linear blade[s include a blade whose helix angle] to the longitudinal axis of the mixing rotor is [set at] 15 to 35°.

3. (Amended) A mixing rotor according to claim 1, wherein the [leading] end of the first longer blade at the longitudinal middle side of the mixing rotor is located at a position spaced apart from the second longer blade by 124° or larger in the circumferential direction of the mixing rotor.

4. (Amended) A mixing rotor [according to claim 1 wherein] for use in a batch mixer including a mixing chamber, the mixing rotor comprising a plurality of mixing blades, each mixing blade having a tip for defining a tip clearance against an inner surface of the mixing chamber where the mixing rotor is to be rotatably placed to impart shearing forces to a material to be mixed in the tip clearance, wherein the plurality of mixing blades include a pair of longer blades twisted in such a direction as to cause the material to flow toward a longitudinal middle side of the mixing rotor, and the pair of longer blades include a first longer blade which is linear in a development of the mixing rotor developed into a plane about its longitudinal axis and extends from one longitudinal end of the mixing rotor toward the longitudinal middle side thereof, and a second longer blade which is substantially nonlinear in the development and extends from the other longitudinal end of the mixing rotor toward the longitudinal middle side thereof and whose helix angle gradually increases toward the other longitudinal end, wherein the mixing blades further include a first shorter blade twisted in such a direction as to cause the material to flow toward the longitudinal middle

side of the mixing rotor, and the first shorter blade is linear and arranged behind the first longer blade with respect to a rotational direction of the mixing rotor and extends from the one longitudinal end of the mixing rotor toward the longitudinal middle side thereof.

5. (Amended) A mixing rotor according to claim 4, wherein the [leading] end of the first longer blade at the longitudinal middle side of the mixing rotor is located at a position spaced apart from the second longer blade by 120° or larger in the circumferential direction of the mixing rotor.

6. (Amended) A mixing rotor according to claim 4, wherein the [leading] end of the second longer blade at the longitudinal middle side of the mixing rotor is located substantially in the middle between the [leading] end of the first shorter blade at the same side and the first longer blade in the circumferential direction of the mixing rotor.

8. (Amended) A mixing rotor according to claim 7, wherein the [leading] end of the second longer blade at the longitudinal middle side of the mixing rotor is located substantially in the middle between the [leading] end of the first shorter blade at the same side and the first longer blade in the circumferential direction of the mixing rotor.

9. (Amended) A mixing rotor according to claim 7, wherein the [leading] end of the first longer blade at the longitudinal middle side of the mixing rotor is located at a position spaced apart from the second longer blade by 120° or larger in the circumferential direction of the mixing rotor.

10. (Amended) A mixing rotor according to claim 9, wherein the [leading] end of the second longer blade at the longitudinal middle side of the mixing rotor is located substantially in the middle between the [leading] end of the first shorter blade at the same side and the first longer blade in the circumferential direction of the mixing rotor.

11. (Amended) A batch mixer comprising:

a chamber including a mixing chamber; and

a mixing rotor rotatably placed in the mixing chamber, and including a plurality of mixing blades, each mixing blade having a tip for defining a tip clearance [between a tip of the mixing blade and] against an inner surface of [a] the mixing chamber [where the mixing rotor is rotatably placed] to impart shearing forces to a material to be mixed in the tip clearance, [wherein the plurality of mixing blades include a nonlinear blade which is substantially nonlinear from a start point to a terminal point in a development of the mixing rotor developed into a plane about its longitudinal axis, and other linear blades which are linear in the development,] wherein the plurality of mixing blades include a pair of longer blades twisted in such a direction as to cause the material to flow toward a longitudinal middle side of the mixing rotor, and the pair of longer blades include a first longer blade which is linear in a development of the mixing rotor developed into a plane about its longitudinal axis and extends from one longitudinal end of the mixing rotor toward the longitudinal middle side thereof by or beyond the longitudinal middle thereof, and a second longer blade which is substantially nonlinear in the development and extends from the other longitudinal end of the mixing rotor toward the longitudinal middle side thereof beyond the longitudinal middle thereof and whose helix angle gradually increases toward the other longitudinal end.

12. (Amended) A batch mixer according to claim 11, wherein the helix angle of the linear blade[s include a blade whose helix angle] to the longitudinal axis of the mixing rotor is [set at] 15 to 35°.

13. (Amended) A batch mixer according to claim 11, wherein the [leading] end of the first longer blade at the longitudinal middle side of the mixing rotor is located at a position spaced apart from the second longer blade by 120° or larger in the circumferential direction of the mixing rotor.

14. (Amended) A batch mixer [according to claim 11, wherein] comprising:

a chamber including a mixing chamber; and

a mixing rotor rotatably placed in the mixing chamber, and including a plurality of mixing blades, each mixing blade having a tip for defining a tip clearance against an inner surface of the mixing chamber where the mixing rotor is to be rotatably placed to impart shearing forces to a material to be mixed in the tip clearance, wherein the plurality of mixing blades include a pair of longer blades twisted in such a direction as to cause the material to flow toward a longitudinal middle side of the mixing rotor, and the pair of longer blades include a first longer blade which is linear in a development of the mixing rotor developed into a plane about its longitudinal axis and extends from one longitudinal end of the mixing rotor toward the longitudinal middle side thereof, and a second longer blade which is substantially nonlinear in the development and extends from the other longitudinal end of the mixing rotor toward the longitudinal middle side thereof and whose helix angle gradually increases toward the other longitudinal end, wherein the mixing blades further include a first shorter blade twisted in such a direction as to cause the material to flow toward the longitudinal middle side of the mixing rotor, and the first shorter blade is linear and arranged behind the first longer blade with respect to a rotational direction of the mixing rotor and extends from the one longitudinal end of the mixing rotor toward the longitudinal middle side thereof.

15. (Amended) A batch mixer according to claim 14, wherein the [leading] end of the first longer blade at the longitudinal middle side of the mixing rotor is located at a position spaced apart from the second longer blade by 120° or larger in the circumferential direction of the mixing rotor.

16. (Amended) A batch mixer according to claim 14, wherein the [leading] end of the second longer blade at the longitudinal middle side of the mixing rotor is located substantially in the middle between the [leading] end of the first shorter blade at the same side and the first longer blade in the circumferential direction of the mixing rotor.

18. (Amended) A batch mixer according to claim 17, wherein the [leading] end of the second longer blade at the longitudinal middle side of the mixing rotor is located substantially in the middle between the [leading] end of the first shorter blade at the same side and the first longer blade in the circumferential direction of the mixing rotor.

19. (Amended) A batch mixer according to claim 17, wherein the [leading] end of the first longer blade at the longitudinal middle side of the mixing rotor is located at a position spaced apart from the second longer blade by 120° or larger in the circumferential direction of the mixing rotor.

20. (Amended) A batch mixer according to claim 19, wherein the [leading] end of the second longer blade at the longitudinal middle side of the mixing rotor is located substantially in the middle between the [leading] end of the first shorter blade at the same side and the first longer blade in the circumferential direction of the mixing rotor.--